

- 23 -

CLAIMS

1. A method of coating a substrate to provide a product which comprises or includes the steps of
heating the substrate sufficiently to enable its powder coating,
5 applying a coating of a powder ("the first powder coating") to the sufficiently heated substrate,
at least partially heat curing the first powder coating,
applying a subsequent powder coating (whether the same powder or different) ("the second powder coating") to the at least partially cured
10 and still sufficiently heated first powder coating, and
heat curing the second powder coating,
wherein the at least partial curing of first powder coating and/or the curing of the second powder coating involves movement of a surface of the substrate or coated substrate relative to plural infrared ("IR") radiant heat sources
15 thereby to provide a pulsing of exposure to the maximum heating effect of each heat source irrespective of whether or not one or more of such heat sources itself or themselves pulse its or their infrared output.
2. A method of claim 1 wherein the curing of the second powder coating involves movement relative to plural infrared radiant heat sources.
- 20 3. A method of claim 1 or 2 wherein the curing of the second powder coating completes the curing of the first powder coating.
4. A method of any one of the preceding claims wherein at least one of the heat sources itself is a pulsing infrared radiant heat source.
5. A method of any one of the preceding claims wherein the relative
25 movement is continuous.
6. A method of any one of claims 1 to 4 wherein the relative movement is intermittent.
7. A method of any one of the preceding claims wherein the heating of the substrate is with an infrared radiant heat source or sources and there is movement
30 of the substrate relative thereto.

- 24 -

8. A method of any one of the preceding claims wherein the infrared radiant heat sources are stationary.

9. A method of any one of the preceding claims wherein the substrate and developing product is carried by a conveyor.

5 10. A method of claim 9 wherein a majority of said heating, at least partial heat curing and heat curing involves pulsing infrared heat sources passed which the substrate or developing product is carried.

11. **A method of coating a heat sensitive substrate** which comprises or includes the steps of

10 pre-heating the heat sensitive substrate,
applying a first coating of a powder,
at least partially curing the powder coating,
applying a subsequent powder coating (whether the same powder or
different) ("the second powder coating") over the at least partially cured first
15 powder coating, and either
(i) curing the second powder coating, or
(ii) causing the melting and flowing of the second powder coating and
thereafter UV curing that coating.

wherein at least one of the pre-heating, at least partial curing and curing
20 steps involves presentation to spaced infrared ("IR") sources thereby to provide a pulsing of the IR exposure.

12. A method of claim 11 wherein the IR sources are intermittent or variable in output.

13. **A method of coating a heat sensitive substrate** which comprises or
25 includes the steps of

pre-heating with infrared heating the surface of the heat sensitive substrate,

applying a first coating of a powder to the heated surface,
at least partially curing the first powder coating with infrared heating,

- 25 -

applying a subsequent powder coating (whether the same powder or different) ("the second powder coating") over at least the partially cured first powder coating, and either

- (i) infrared curing the second powder coating, or
- 5 (ii) (a) causing with infrared heating the melting and flowing of the second powder coating, and
- (b) thereafter UV curing that coating,

wherein at least one of the infrared heating steps involves conveyor movement of a surface of the substrate or coated substrate relative to plural
10 infrared sources.

14. A method of claim 13 wherein at least one of the infrared sources pulses or varies in output.

15. **A method of coating engineered wood substrate** which comprises or includes the steps of

- 15 pre-heating the heat sensitive substrate,
- applying a first coating of a powder,
- at least partially infrared radiation curing the powder coating,
- applying a subsequent powder coating (whether the same powder or different) ("the second powder coating"), and
- 20 infrared radiation curing the second powder coating,

wherein each of said infrared radiation steps involves spaced infrared radiation sources.

16. A method of claim 15 wherein at least some of such sources pulse or vary in output.

25 17. **The use of spaced infrared ("IR") heat sources** spaced relative to a conveying direction to treat each of two powder applications to a heat activated substrate.

18. The use of claim 17 wherein said spaced IR heat sources pulse in output.

19. **Any product** being a substrate coated by a method of any one of claims
30 1 to 16 or as a result of a use in accordance with claim 17 or 18.

- 26 -

20. **As a product, any product that includes at least in part a heat sensitive substrate that has been coated by two layers, a first layer being of a powder coating, and the second layer being of a powder coating, the coating procedure has been characterised in that:**

5 the substrate was preheated prior to the application of the first coating of powder and such preheating was with a IR heating source and/or otherwise with a heating source controlled to provide sufficient heating for the purpose (e.g. to enable powder retention) without any substantial damage to the substrate,

10 the first coating of powder is at least partially cured under the action of at least one controlled IR heating source thereby to reduce damage to the heat sensitive substrate, and

 the second powder coating is either cured by at least one controlled infrared heating source or a combination of at least one controlled infrared heating source and a source of UV,

15 **wherein** the control has in at least one case required the use of spaced and/or pulsing IR sources.

21. **A product of an engineered wood substrate or at least in part of an engineered wood substrate** wherein the substrate, prior to any coating, has been subjected to surface heating to achieve at least some measure of heat induced degassing thereof and heat activation of the surface, and thereafter at least two powder coating layers have been applied with the innermost layer being at least partially cured reliant on infrared heating prior to application of any further layer(s) and the subsequent layer or subsequent layers being cured by infrared heating or a combination of infrared heating and UV radiation.

22. **A coating on a heat sensitive substrate** which is or was a green or partially cured powder coat having thereover a subsequently applied and cured powder coating, the cured powder coating having been powdered over the first coating subsequent to at least a partial curing thereof.

23. **A coated substrate, said substrate**

- 27 -

wherein the coating has been of at least two powder applications,

and wherein the first powder application prior to the powder application of its contiguous layer was green cured,

and wherein the combined coatings have been subjected to the heat from
5 intermittent or varying infrared sources thereby to provide at least melting and flowing of the outer layer, and, optionally, some further curing of the inner layer.

24. A method substantially as hereinbefore described with reference to any one or more of the accompanying drawings.

25. A product of the method of claim 24.